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ABSTRACT

Major considerations in planning and implementing curriculum changes in science education are presented in this handbook. Steps for building a general framework for curriculum planning are related to key questions which should be considered in applying this framework to an approach selected. Presented are characteristics of the major approaches to curriculum planning; i.e., the Social Demand approach, the Manpower approach, and the Cost-Benefit approach. The factors of demography, attitudes of social groups, governmental educational policy and expected rate of economic growth are considered in terms of curriculum planning. Methods of getting real costs of education and problems characteristic of rural and primary school education are discussed. Requirements (community support, money, prepared teachers, and planning) of curriculum change are emphasized, and strategies for effecting curriculum change are outlined. The roles of the advisor and curriculum planner are defined. Finally, ten conditions that have been established for success in educational planning are listed. (CS)

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CURRICULUM PLANNING AND IMPLEMENTATION

IN SCIENCE EDUCATION

A Handbook of General Competencies and Strategies for the Educational Planner and Advisor

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Introduction

Educational planning, in the most broad sense, is the application of rational, systematic analysis to the process of educational development with the aim of making education more effective and efficient in responding to the needs and goals of its students and society (Coombs, 1970, p. 14). It deals with the future, drawing ideas from the past. It is a blueprint for the present but also a plan for the future. Therefore it is a continuous process concerned not only with where to go but with how to get there and by what best route. What is the educational planner and advisor's role in this complex process?

The history of educational planning prior to World War Two had four key features:

1. it was short-range in outlook
2. it was fragmentary in its coverage of the educational system
3. it was non-integrated in the sense that educational institutions were planned autonomously without explicit ties to the evolving needs and trends of the society and economy at large
4. it was a non-dynamic kind of planning which assumed an essentially static educational model that would retain its main features intact for years (Coombs, 1970, p. 19).

These features were unsuccessful and required that a new kind of planning became necessary, a planning which looked to the past, present, future, and saw the evolution of education as necessary. It is the purpose of this paper to discuss general guidelines for personnel involved in national and international educational planning in science education. Educational planning in developing countries will be emphasized.

Educational planning and advising occurs in most nations of the world. Developing nations have the most crucial problems with educational planning and advising, because of the following factors:

1. Often large numbers of people are uneducated,
2. The nation feels development a necessity,
3. Education seems a key to development, and
4. Finally, a drive to spread education throughout the nation begins.

At a series of UNESCO conferences early in the 1960's education ministers of Asia, Africa and Latin America set ambitious regional targets for educational expansion in their respective regions to be achieved by 1980 (by 1975 in the case of Latin America). These targets were widely adopted by individual nations. They called for 100 per cent participation in primary education by the end of the target period, and sharply increased participation rates in secondary and higher education (Coombs, 1970, p. 25).

In this immense undertaking problems arose which generally had not been foreseen. Educational planning and advising could not adequately deal with them beforehand. However, their development has emphasized the need for careful attention to planning. These problems were:

1. Wasteful imbalances within the educational system. For example, school construction may have received a high priority while the expansion of teacher training was neglected.
2. Demand in excess of capacity.
3. Costs rising faster than revenues.
4. Non-financial problems. In particular these were:
   A. The limited administrative abilities of educational systems to plan and to transform plans and money into desired results.
   B. The long time required to recruit and develop competent staffs for new schools and universities.
   C. The limited capacity of local construction industries.
5. Not enough jobs for the educated eventually produced by the schools.
6. The wrong kind of education. For example, most education did not condition rural youth for leadership in rural and in agricultural development, which was indispensable to over-all national development, instead it tended to alienate them from their rural surroundings.

While all these problems greatly handicapped many nations, great efforts and strides towards mass education were taken. The lesson is that in view of our knowledge of what can happen planners and advisors must carefully consider what they do.

In order to appropriately plan for effective science education the planner must work from the general to the specific. Such a procedure may begin with a study of the history of educational planning and move through a discussion of priorities and objectives and end with strategies for implementation and evaluation of science curricula.

To make real progress in planning, a general framework for such planning must first be built. Such a framework can include the following five propositions.

1. Educational planning and advising should take a long range view. Ideally this should be constructed of three sections:
   A. Short-range (one to two years)
   B. Middle-range (four to five years)
   C. Long-range (ten to fifteen years)
2. Educational planning should be comprehensive. Advising should fit into a comprehensive plan.
   A. It should embrace the whole educational system.
   B. It should attempt to extend its vision to important types of non-formal education and training to ensure their effective integration with formal education and with the priority needs and goals of society.
3. Educational planning should be integrated with the plans of broader economic and social development.
4. Educational planning should be an integral part of educational management. It must be closely tied to the processes of decision-making and operations.
5. Educational planning must be concerned with the qualitative aspects of educational development, not merely with quantitative aspects (Coombs, 1970).

In order to apply these five propositions to practice the educational planner and advisor must consider five key planning questions.

1. What are the priority objectives and functions of the educational system and each of its sub-systems (including each level, institution, grade, course, class)?
2. What are the best of the alternative possible ways of pursuing these various objectives and functions? (This involves consideration of alternative educational technologies, their relative costs, time requirements, feasibility, educational effectiveness, etc.)
3. How much of the nation's (or community's) resources are devoted to education at the expense of other things? What appear to be the limits of feasibility, in terms not only of financial resources but of real resources? What is the maximum of resources that education can effectively absorb in a given time period?
4. Who pays? How is the burden of educational costs and sacrifices distributed among the direct recipients of education and society at large, and among different groups in society. How well adapted is the present public fiscal structure, and other sources of educational revenue, to attaining a socially desirable distribution of the burden and at the same time a sufficient flow of necessary income to education?
5. How are the total resources available to education allocated among the different levels, types and components of the system (e.g. teachers salaries vs. building and equipment vs. textbooks, free meals, scholarships, etc.)?

Major Approaches to Planning

These key planning questions often involve three major approaches to educational planning. These are the Social Demand approach, the Manpower approach, and the Cost-Benefit approach (or Rate-of-Return approach).

The Social Demand approach most commonly means the aggregate popular demand for education, that is, the sum total of individual demands for education at a given place and time under the prevailing cultural, political and economic circumstances. The culture itself, the climate of attitudes and convictions about what education can do for people, is undoubtedly the most influential factor of all in determining the social demand for education, provided people can pay for it (Coombs, 1970).

The Manpower approach is preferred by many economists. The argument in its' favor is as follows: Economic growth is the mainspring of a nation's total development and thus should be the major consideration in allocating its scarce resources. Economic growth, however, requires not only physical resources and facilities but also human resources to organize and use them. Thus the development of human resources through the educational system is an important prerequisite for economic growth and a good investment of scarce resources, provided the pattern and quality of educational output is geared to the economy's manpower needs (Coombs, 1970). The Manpower approach can usefully call attention to extreme gaps and imbalances in education's output pattern that needs remedy. It can also give educators useful guidance on how, roughly, the educational qualifications of the labor force ought to evolve in the future -- what the relative proportions should be of people with a primary education or less, secondary education, and various amounts of post-secondary training. However, it can also attempt to delineate details of manpower requirements, but this is exceedingly difficult due to lack of available demographic data in most nations and to the occurrence of unforeseen economic and social upheavals in the world.

The Cost-Benefit approach is what an individual roughly applies when deciding how best to spend his money when his desires exceed his means. He examines his alternatives, weighs the cost of each and the corresponding satisfaction or utility he feels it will bring him, and then chooses those particular options within his means that promise the highest ratio of benefits to costs. At its present stage this approach tells us much more about the past than it does about the future. While we can usefully learn from history, a developing nation does not want to repeat it. Given the paucity of good data to work with and the need to make a number of tenuous assumptions about the economic future, this approach must be treated with caution by planners and advisors.

None of these approaches provides an adequate basis by itself for educational planning and advising. The major weakness of all three is that they implicitly take the existing educational system for granted and leave it untouched except for its scale. They are essentially instruments for macro-planning and as such can be very useful. However, today most educational planning and advising is concerned with getting down inside the system and changing it to make it more relevant and efficient and productive.

Five needs for improvement in educational planning and advising are evident today and must be dealt with. They are:

1. The three approaches (Social Demand, Manpower and Cost-Benefit) must be synthesized into a more coherent and unified approach.
2. The numerous methodologies required to apply this more unified approach must be further refined and strengthened.
3. An effort must be made by the educational system to improve the information flows needed for effective planning and advising.
4. A general appreciation of planning must be instilled in those whose participation in the planning process is essential.
5. Organizational and administrative arrangements, attitudes and behavior patterns must be drastically altered to accomodate effective planning.

General Factors in Planning

Once embarked upon devising an educational plan it is necessary to fix targets and to decide the amounts of money to be spent. This cannot be done

independently of the general growth prospects of the economy or of the economic planning services. The types of factors which influence enrollment should be determined.

The first such factor of influence is demography. This is a basic condition which has heavy influence for the entire educational policy.

A second factor is the attitudes of the different social groups toward further schooling (beyond primary) and the changes in these attitudes (Poignant, p. 33). The planner should investigate differences according to social and occupational groups and according to district. Trends in the attitudes of social groups should also be studied. In some countries a trend favoring more secondary education occurs with economic growth and the rise in the standard of living of all social classes, bringing with it a general awareness of the advantages to be gained from further education. In the very long term, it indicates a tendency towards equalization of the behavior of the different social groups. The planner's problem is to estimate the extent to which this trend will affect the number of enrollments during the period of the plan.

A third factor is government educational policy. Such action may take the form of: encouraging voluntary further education by providing financial aid; overcoming geographical difficulties; facilitating the transfer from primary to secondary schools; and extending admission to the university to those having completed training in technical secondary schools (Poignant, 1967, p. 36).

The expected rate of economic growth is the fourth factor to be considered. Economic expansion and the resulting rise in family living standards create new material and psychological conditions which favor the expansion of further education. To some extent, the changing demand for education might be said to be simply a reflection of economic progress. The need to train the workers, executives and experts required to develop the economy means that manpower needs are an important second aspect of this factor, which should be considered when fixing the targets for the educational plan.

By analyzing all the factors described above, forecasts can be made which show the expansion required at the various levels of education and in various levels of education and in various special categories.

Once targets are set they should be reviewed and decisions made as to the levels and branches of education which are to be given priority.

Demographic expansion must be given absolute priority in a country where all the children go to school. Where compulsory schooling is not yet general, the demographic factor is no longer a first priority.

Family demand may or may not be met in full, depending on whether social considerations or purely economic motives must be taken into account.

Basic reforms such as longer compulsory schooling may be applied immediately, postponed temporarily, or spread over a longer period.

Training plans for skilled and highly skilled personnel should in principle be kept intact since they are an actual condition of economic growth.

These are all quantitative priorities. Qualitative priorities may also be considered. Within the financial limits set, the decision must be made to expand education quantitatively to its limits, or to restrict its expansion to maintain, or improve, the quality of education.

The choice of standards is perhaps the largest qualitative problem. It occurs in every area but perhaps most frequently in the area of science education. A decision must be made on what standards to require of the teachers and on what pupil-teacher ratio to set. The choice made generally determined how many pupils will be served within the financial limits available.

The use of new teaching methods is another problem area. In many developing countries, the rapid demographic expansion and the scarcity of human and financial resources have so restricted the choice between quantity and quality that the

whole question of teaching methods may have to be reviewed; a widespread and reasonably adequate education must be attempted but it must cost less than traditional education (Poignant, 1967, p. 44).

The choice of qualitative priorities should be based on both teaching and financial considerations. If this choice is to be really valid, it will require very active cooperation between the Department of Ministry of Education and teachers in compiling the plan, and also a new slant to research on teaching methods. From the financial point of view, the choice should be based on preliminary studies of the real cost of the education provided by the various alternative systems. Consequently, the analysis of the costs and, if possible, of the returns corresponding to the variations in cost, is an important aspect of educational planning.

No nation can have all the education which it thinks necessary or desirable, rather any country must promote or emphasize programs which have high priority and discard or tone down those with low priorities. Choices must be made in six critical areas.

1. The choice between levels of education.
2. The choice between quality and numbers.
3. Science and technology versus the liberal arts.
4. Formal education versus non-formal training.
5. The choice of incentives.
6. The purpose of education (the needs of the state or of the individuals within it).

(Harbison, 1967, 12-15)

The essence of planning is the making of choices in the six critical problem areas described above, and making them so as to strike a balance between priorities and thus promote the social and political as well as the economic, goals of the country.

Costing Educational Plans

Once an educational plan has been developed it is essential that it be costed. Generally, to do this a unit is chosen, either; 1.) the number of teachers, or,

2.) the number of pupils, or, 3.) the number of schools, as a basis for costing. On this basis, a range of data is provided, -- that is to say the cost of providing the given unit is derived from experience, and then the national unit cost is multiplied by the total number of units in the system to derive the total cost.

National unit cost x Total number of units = Total Cost in the system

No one of these units is generally suitable for all purposes. Roughly, for educational costing purposes, it is fairly safe to assume that the crucial variable is the number of teachers. It would be unsafe, however, to assume that this is the only variable. The best procedure would be to divide educational costs into three parts:

1. Those related to pupils,
2. Those related to teachers,
3. Those related to buildings,

and to adopt units for each of these parts. (Anderson, 1967, 13-14).

Once the data for costing a plan has been assembled, then they can be used to help decide priorities. The costing of alternative programs as accurately as possible over the longest possible period as a basis for reasonable comparisons is one of the fundamental purposes of the costing procedures. Generally the costs of education are largely fixed in the short run, so that the real issue that has to be faced is the problem of making cost projections for the middle and long range when choices are more open. Since the longer ahead the cost is projected for, the more hypothetical the figures become, ranges of estimates are necessary which take into account factors which are likely to affect future costs in education.

Six basic factors can be considered.

1. The first factor is that there will be changes in the price level, in real costs. Since the major item in an educational budget is teacher's salaries, and these do always move in the direction of the general price index, it is important to devise a price index for education separate from that of the index used for the exonomy as a whole.

2. The second factor which affects educational costs is the changes in the relative proportions of the goods and services that enter into education, of which the chief item is the teacher's salaries.
3. The third factor which affects educational costs is the increase in the child population. Not only the total size of the child population is important but its distribution between various age groups is also relevant.
4. The fourth factor affecting educational outlays in the future is the rise in educational standards and in the demand for education.
5. The fifth factor is the raising of the school-leaving age and possibly the lowering of the age at which compulsory attendance occurs.
6. The sixth factor is that the unit costs of higher education are many times higher those of elementary education, and the development of higher education is an integral part of the development of the whole education system. Therefore, when costing educational plans for primary and secondary schools it is essential to bear in mind the rapid development of higher education and its effects on the total cost picture.

(Anderson, 1967, 21-24)

In making long-term forecasts, therefore, we have both pressure on the total number of pupils to be educated and rising unit costs. These increasing unit costs originate from the fact that;

1. The standards of education rise,
2. Older children cost more to educate and,
3. A shift in the cost structure of education occurs because of changes in price levels.

The purpose of the planner is to get to the real costs of education as opposed to the money costs and these six factors will be found to be a necessary part of the whole analysis.

Rural Education

Rural education is the most underdeveloped and in need of any sector of education in most nations. The rural economy generally has need of two types of educated persons while it is developing. First, there is the group of employees of ancillary services, some paid by government or large companies and employed in various occupations such as pest control, irrigation, health services and crop-grading, and some their own masters but involved increasingly in the modern economy and its standards, such as builders, carpenters, automobile and farm machinery mechanics, and electricians. Secondly, there is the larger group of peasant farmers and their wives (Griffiths, 1968, p. 21).

In the early stages of economic development, the first group, the ancillary services, may attract enterprising spirits. As the economy develops the numbers in the first group tend to rise and in the second to drop. Farm laborers, probably will not need schooling in the early stages of development, but begin to need education as modern farming methods develop.

With full-scale development programs in being, the primary and lower secondary schools might well be expected to contribute substantially to the achievement of the following objectives in the quality of the rural population.

1. Incentives: The adoption of more ambitious standards of living with sufficient realism to call forth new effort.
2. Attitudes and habits:
   A. inquiring minds
   B. increased foresight and a readiness to look further ahead
   C. increased accuracy and reliability
   D. initiative in adopting a method or taking some action on which others in the community are holding back
   E. readiness to work hard outside the customary times, when necessary
   F. readiness to cooperate in the new ways and with the increased efficiency demanded by more modern institutions
3. Skills:
   A. reading
   B. writing
   C. calculating
   D. handiness (for all the odd jobs around a farm)
4. Knowledge and understanding:
   A. of change
   B. of economics
   C. of science (an elementary insight into scientific method, where it can and where it cannot be applied; other approaches to knowledge, old and new, especially those linked with local beliefs and problems, elementary biology)
   d. of hygiene and food.

(Griffiths, 1968,)

It will be seen that, apart from the learning of some elementary skills, the stress is on acquiring certain attitudes of mind and the bases for understanding and cooperating in change. Adding to the quantity of factual knowledge is not the problem, but changing the quality of thinking very much is.

The planner will have to be clear whether his planned development of rural education is to be aimed at achieving all or only some of these objectives. He cannot arrive at a satisfactory opinion on this unless he knows the time, the money, and the number and quality of the staff that would be required to bring about different degrees of educational change. Once he has these essential figures he can weigh the urgency of each of these reforms against developmental demands in other sectors of the economy.

Starting with what is presently available, the planner intent on improving the qualtiy of rural schooling can recommend objectives of different levels of difficulty, depending on the men, money, and materials that can be made avaialble and on the time that must elapse before the reforms become effective in the schools.

As a first, minimum step it would be wise to scrutinize the content of the books used by the children and the schemes of work drawn up by the teachers. If, as is likely, these are found to have little reference to rural life and its practical activities, it should be possible, without scrapping existing books and schemes, to introduce supplementary material more closely related to the needs and interests of the community around the school.

Even to achieve these reforms, it is necessary to devote time and thought to the method of presenting these new materials to the teachers. With poorly educated and often untrained teachers, it is of little use expecting brief notes or outlines to be effective. The material must be worked out in detail for them by educators experienced in the work of the primary school, and they must be taken through it, step by step, in short courses. The more this supplementary material can be made specific to a locality, perhaps with the assistance of local development officers, the more chance there is that it will be taught with a sense of realist and not treated as an academic exercise.

Any reform going beyond these limited measures must involve not only a change in teaching methods, but also a change in the conception that the average teacher has of his job. For this, one needs money, time, widespread cooperation, continuity of policy and personnel, and leadership of a high qualtiy.

To achieve maximum change a revolution in the kinds of teaching in the schools is necessary. The difficulties in the way are considerable:

1. Since it is a basic duty of the teacher to teach elementary skills in reading, writing, and mathematics and certain established factual knowledge, he resists the idea of encouraging children to find things out for themselves. Inquiring seems a waste of time to him when he could tell them.
2. If inquiry is encouraged, the poorly educated and ill-read teacher may find himself often unable to deal with children's questions.
3. A forward-looking but realistic concern attempting to link the simplified, clear-cut knowledge of the classroom with the complicated, changing affairs of everyday life not only is to exchange certainty for uncertainty, but seems to many to conflict with the duty of teaching the children a standard set of skills and information on which they can be examined.

The teacher who can skillfully teach for change is usually a person of considerable education. Normally he or she needs to have been through the kind of education in depth that is given at the post-secondary and university level. Such education is expensive, not only because of its length but also because of the increased salary rates subsequently demanded by the teachers.

The achievement of maximum reform would therefore take a long time, perhaps thirty years or more, while a generation of teachers received a much fuller education. It would also involve a great increase in expenditure to attract students of better quality to the teaching profession, and a considerable increase in well-qualified staff to man the higher classes in the additional secondary schools and the new training institutions that would be needed. As a long-term program this is the ambition of most countries, but, such a solution would appear to be impractical for the present (Griffiths, 1968, p. 28).

Intermediate objectives are possible. Such a program can be set up as follows. A small unit of half a dozen science education experts on different grade levels can form the core of the movement for reform. Their task will be to prepare in detail the lessons and supplementary material for all grade levels. Whatever their grade level specialties they must work in the closest touch with one another, because each new idea that is introduced must be related as far as possible, to other grade levels, in order to counteract the common habit of teaching something once and expecting complete understanding and application. Teacher's handbooks must be prepared, containing ample suggestions for experiments, investigations, and practical activities the pupils can undertake. Inspectors will need to be guided on what to look for when visiting classes, and examiners must be given suggestions on how to adapt their examination questions to the new curricula. They must estimate what changes in ideas, attitudes, and teaching methods they can, in fact, demand of the majority of teachers with any hope of success. Then, the new courses and materials must be aimed at achieving this degree of change.

A plan with this intermediate objective will take considerable time to have an effect, much more than the two or three years needed for the minimum plan, but much less than having to wait for a new generation of better-educated teachers to mature and take over. One should think in terms of a decade or more.

The costs of the intermediate plan will not be insignificant. They must cover:

1. The employment of a group of experts,
2. The publishing of textbooks and teacher's guides,
3. Broadcasting,
4. In-service courses for teachers,
5. Conferences of inspectors, examiners, and head teachers,
6. Publicity, and
7. Follow-up measures to support ex-pupils.

The plan requires only a small group of highly expert staff, but their quality, the continuity of their service, and the inspiration of their leadership will be crucial.

The effects of the plan are likely to be patchy, but at least some students will catch the new way of looking at things and most teachers will gain a new sense of purpose. But it is essential to regard this as a transitional stage, and not as the final goal of school reform. In the long run, nothing will guarantee work of high quality in the schools, without a group of teachers that is well-educated and well-trained.

The Primary School

The primary schools are the basic part of education. In most countries, most primary schools are rural schools. Most of the children's parents are poor farmers. They do not want their children to become poor farmers. They, their children and most of their children's teachers believe firmly that wage and salary earners live a better life than subsistence farmers, that town life is superior to village life.

Primary schools are part of an education system which is both selective and competitive. For this reason it is hardly realistic to expect parents, children and teachers to regard primary school in the tolerant, easy-going way in which it is often regarded in Western societies.

The primary school system is the largest part of any country's education system, but often it is the poorest in both money and quality. Nor would it be realistic to expect any immediate betterment in the financial prospects for these schools. Populations are rising, economic growth is barely keeping up with these figures,

and most countries are committed to a policy of quantitative expansion of primary school systems to overtake the population growth.

Qualitative improvement is sadly needed, most significantly in the standard of those who teach. Teachers, are mostly under-educated,under-trained and under-paid. Possibly, most important of all, they are under-valued.

A closer look at what primary schools teach and how they teach it reveals serious problems. In most cases the curriculum in schools is inappropriate to the needs of the children and the community. In many cases the schools are bad because the teaching in them is formal, unstimulating and inefficient.

These inadequacies are often apparent in their syllabi of instruction. But, in most schools, it is neither the syllabus nor the examination requirements which are the main determinants of what teachers teach children; rather it is a kind of oral tradition of 'survival teaching' handed down from one hard-pressed, under-trained teacher to another.

Everyone agrees that change is needed, but as to what kind of change is required there are two rather different points of view. One, there are those, mostly educators, who see curriculum reform largely in terms of the improvement of the process of learning. Two, then there are those, mostly political leaders, who see as the main function of curriculum change, the reorientation of youth to the rural community which so many of them are now striving to desert.

Though views on the purpose of primary education may differ, the desire to change the present system as quickly as possible is almost universal, and a good deal of activity is, and has, taken place. Unfortunately, there is little effect by all of

this curricular activity on the attitudes and approaches of those who teach, those who learn and those who send them to school (Hawes, 1972, p. 17).

These failures are due to several factors:

1. The difference in objectives between those who design and those who teach curricula.
2. The lack of money and the lack of manpower to carry out the planned changes.
3. A basic underestimation of the difficulties and complexities involved in achieving effective curriculum change.

Curriculum Change Requirements - Primary Through Secondary Levels

What does curriculum require? Curriculum change requires community support. The chief difference of opinion between curriculum planners and the curriculum users arises over attempts to introduce rural and practical elements into the curriculum in the hope of persuading school leavers not to forsake the land. In this respect what the educational planner believes is good for the community as a whole is not what the individual child and his parents believe is good for him. It appears, therefore, that, since those who frame primary school curricula are often at cross-purposes with those who use them, considerable consultation should take place between the two.

Secondly, curriculum change costs money. "Good education costs more than bad," as C.E. Beeby has said (Beeby, 1966, p. 20). Yet the following situations still exist.

A. At present, most lower grades subsist on a single reading text with the result that children learn to read the reader but not to read. Sufficient reading and library materials cost money.
B. Frequently, primary school classes are overcrowded and housed in very temporary accommodations. Proper management of primary activities requires, besides a well-trained teacher, a limit to the number of children in one class, a minimum standard of equipment, and a lockable classroom where it can be set out and displayed. Moveable furniture is also desirable though not, perhaps, of the very first priority. All these things cost money.

C. Quite often where the teaching of vocational or pre-vocational skills is attempted lack of equipment may make it impossible to actualize. Tools and seeds, cloth and thread and sewing machines cost money, far more money than do chalk and exercise books.

Thirdly, curriculum change depends on people not paper. No factor affects curriculum change so deeply as the energy, capacities and morale of teachers, and one of the main reasons for the failure of so many attempts at curriculum improvement has been that the teachers have been unable to implement the new syllabi and materials, either by reason of their insufficient basic education for because their training had not fitted them for the new approaches and because no significant retraining had taken place.

The difficulties and costs of re-training have everywhere been sadly underestimated. Even supposing a teacher's basic education has equipped him with the skills and attitudes to study and adopt new methods, which in many cases it has not, it is naive to assume that the complete reorientation of approach, which curriculum changes at the primary level often postulate, can adequately be imparted in a week's refresher course. Let us assume the situation where the curriculum planner would like to introduce the new approaches to primary education current in Europe or America into a system largely formal in its emphasis. How much is demanded of the average teacher? He may be asked to acquire:

A. New approaches to mathematics, involving the learning of a new terminology and an entirely new approach to number relationships.
B. New approaches to science, involving an emphasis on observation of local environment and an understanding of scientific process totally new to those schooled in a historical and descriptive approach to the subject.
C. New approaches to the teaching of environmental study, involving a synthesis of subjects hitherto considered separate and an emphasis on practical experience totally at variance with traditional literary methods.

D. Skills in the teaching of vocational and pre-vocational subjects involving, for teachers trained in a traditional pattern, not only a great fund of new knowledge and techniques but also a new attitude to the purpose of education (Hawes, 1972, p. 21).

The ordinary teacher is being asked to acquire a vast amount of new knowledge. At the same time increased intellectual demands are being made of him requiring greater initiative and more work. Better curricula simply do require better educated and more highly trained teachers from the training colleges.

Fourth and last, curriculum change requires planning. There are many problems related to curriculum planning which also can affect change. Some are:

A. Problems connected with language policy.
B. Problems connected with the production, publication, and distribution of new materials.
C. Problems connected with the reconciliation of new patterns of thought and behavior, demanded by a new instructional approach, with those dominant in a traditional society.

Changes in the curriculum also bring about quantitative changes in the educational system (and thus require careful planning). The effects of proposals for change on quantitative aspects can occur in ten general areas.

I. Changes in curricula, syllabi, and other school activities.
   A. A change in emphasis among subjects or the introduction of new subjects and/or the abolition of others may have effects on staffing formulae, with chain effects on student/teacher ratios, recurring costs per student, and, if housing is provided for teachers, capital costs.
   B. Such changes also alter the proportionate needs for specialist teachers of each subject, which in turn would change the needs for the numbers of trainees in teacher training and/or university courses.
   C. Changes in the nature and/or quantity of premises and equipment arising from changes in curricula, syllabi and other school activities would result in changes in unit costs, both recurring and capital.

II. Changes in teaching methodology
   A. This may have an effect on the sizes of teaching groups and staff requirements. There would also be a change in requirements of equipment, and in costs.
   B. The whole of the technical aspect must be considered - that is, staff, buildings, equipment, running costs, etc. for which the full cost may not be available.

III. Changes in the requirements of training and qualifications of teachers
   A. A change of this nature is usually an upgrading of total education and training required of a teacher. Such a change can have an important effect on salary rates and costs.
   B. A change in the length of training means a change in the output from the same total enrollment or vice versa.
   C. A change in the level of intake may mean a need for higher qualified staff in the teacher training colleges and a consequent problem with regard to the disposition of the existing lower qualified staff and the possibility of additional training for them.

IV. Changes in class sizes and/or student/teacher ratios
   A. There would be a resultant change in the numbers of classes and/or teachers required for the same given enrollment.
   B. There might be a need to change the sizes of rooms, and possibly adapt existing buildings.
   C. Thus, there would be consequent changes in both capital and recurring unit costs.

V. Changes in the structure of the school system
   A. If a new type of course were introduced, some of the important factors which would have to be considered are:
      1. The educational level for entry to the course.
      2. The qualifications and rates of salary of the teachers; and the staffing formula.
      3. The length of the course.
      4. The desirable and practicable size of a school and possibly its amalgamation with other courses in an integrated school.
      5. The need to supply transport or boarding facilities.
      6. Non-teaching staff and their salary rates.
      7. Needs for the daily running and administration of the school.
      8. Arising from all considerations, total recurring and capital costs.
   B. If a course were abolished or reduced in volume, consideration would have to be given to the future of the premises, equipment and staff thereby released. If a course is abolished, plans must be made to run it down since there would be an obligation to students already in the program.

C. If the number of grades of a course is changed or if two successive courses are amalgamated:
   1. To achieve a given output, there would be a change in the total number of places in the course and in the total requirements of teachers, premises and equipment.
   2. An increase in the number of grades means a year without an output, and a decrease means a year with a double output.

VI. Changes in the grade at which specialization occurs may mean considerable changes in the following:
   A. The qualifications and subjects of teaching staff, with possible consequent and changes in salaries.
   B. The kinds of teaching rooms.
   C. The kinds and quantity of teaching equipment.

VII. Changes between separated specialized courses and comprehensive education involves difficult practical and organizational problems and has considerable and complicated effects on needs of staff, premises and equipment and hence on costs, both recurring and capital.

VIII. Changes in policies of promotion of students within a sector of the educational system. A change from tested to automatic promotion will have an effect on repeating and may effect drop-outs, necessitating a change in repeating and promotion rates to be used for projections.

IX. Changes in the school calendar and/or time-table organization and/or utilization of premises
   A. Changes to or from multi-shift or multi-session classes and/or staggering of school calendars and/or time-tables have effects on staffing formulae and scales of buildings and equipment, and consequently on capital and recurring unit costs.
   B. Changes in scales of accommodation for the purpose of changing the degree of utilization of premises have effects on unit costs and to a lesser extent on recurring costs.

X. Changes arising from population distribution and migration
The educational planner must be aware of the practical implications of proposed policy in relation to the distribution of the populations which the schools serve. The policy on the choice of day, day-transportation, or boarding education must be viewed in the light of the practicability of students being able to attend school regularly from their own or other people's homes, traveling on foot or by some form of transportation. (Chesswas, 1969, 39-40)

Strategies for Curriculum Change

The planning of curriculum change is a very complicated business, which, because it has implications at every stage for financial and administrative policy, cannot be divorced from it.

Curriculum change is so complicated that no straightforward statement of the processes involved can avoid the charge of oversimplification. Yet in the simplest analysis it is possible to specify five tasks which face those who would attempt to plan changes.

A. They must gather information on which to base their planning.
B. They should decide what the objectives of their curriculum should be and discuss these objectives with the curriculum users.
C. They need to work out a strategy for curriculum change, decide on its timing and extent, and how it is to be financed. They must set up the administrative machinery to control it.
D. They must undertake the detailed processes of curriculum development: the planning, trial and modification of syllabi and educational materials, leading to their introduction into schools.
E. They need to devise means of evaluation and feedback through the development of an efficient system of school examinations and through other types of formal and informal evaluation to be undertaken at all stages of developing the curriculum.

Basic information to be gathered can be grouped into four major areas.

I. Statistical Information (Should be shown separately by sex and in the form of national aggregates built up area by area, in view of the probability of discrepancies between component areas of the same nation).
   A. Students and population
      1. Comparison of the number of students in a level or stage of an educational system with the estimated population of the age group which corresponds to that level or stage, by means of an enrollment ratio and a non-schooling gap.
         a. Enrollment ratio--the percentage obtained by dividing the total of enrollments in a level or stage of education by the population of the age group which corresponds to that level or stage.
         b. Non-schooling gap--the difference between the estimated population of the appropriate age group and the numbers enrolled in the educational sector corresponding to that group.
         c. The annual progression of these two indicators. If either were worsening this would indicate a need to increase the rate of growth of enrollments if a goal of universal and compulsory education is to be achieved.

B. Flows of students and production of 'outputs'
   1. Grade-by-year sequences of enrollments in each part of the educational system through to the graduates from the terminal grade in the final year.
   2. Information about flows within each part of the educational system in the form of numbers of entrants to the initial grade (and numbers of entrants from outside the sector to other grades, if they are significant), flow rates (promotion, repeating and dropout) and graduation rates.
   3. Information about flows of students from one level or stage to the next in the form of rates of promotion related both to enrollments in the terminal grade of the sector, to source of the students, and to graduates from that grade. (Chesswas, 1969, 16-18).

C. Grouping of students: classes and schools
   1. A complete picture of the class by grade structure of each school, together with the actual enrollment in each class of each grade.
   2. A summary of the total number of classes at each grade in each group of schools.
   3. A summary of the numbers of schools by class structure by grade.
   4. A summary of numbers of schools by numbers of classes and by enrollment sizes.
   5. The average size of a class at each grade.
   6. Numbers of schools by the number and pattern of planned teaching groups, by numbers of teachers and by enrollment by grade. (Chesswas, 1969, p. 22).

D. Teachers and other personnel
   1. Stocks of teachers
      a. The stock of teachers in each part of the educational system compared with the desirable situation based on official staffing formulae.
      b. The stock of teachers in the whole active teaching force and of trained teachers outside of the active teaching force who wish to return to teaching.
   2. Mobility of teachers
      a. Numbers and proportions of graduates (and possibly nongraduates) from teacher-training courses who immediately enter teaching.
      b. Numbers of teachers taking courses for changes in qualifications.
      c. Rates of loss of trained teachers from active teaching classified by reason for leaving.
      d. Rates of return of trained teachers to active teaching classified by source.
      e. Stocks of teachers by age group. (Chesswas, 1969, p. 24).
   3. Student-teacher ratios
   4. Numbers of teachers in service: by sex, by qualification, by national/expatriate
      a. In each sector of educational services
         1). by specialization where applicable,
         2). by proportion of full-time.
      b. By age group (five-year, single year for the last five years before retirement age).
   5. Numbers of trained national teachers wanting to return to teaching
      a. By sex.
      b. By qualification.
      c. By specialization, where applicable.

6. Numbers of students in teacher-training courses.
7. Information on administrators and inspectors similar to that on the stocks and mobility of teachers.
8. Numbers of non-teaching staff and ratio to students.

E. Financing of education (by sector, over as long a period as possible)
1. Sources of funds for recurrent expenditures, separately for national sources and foreign aid, the former by public/private.
2. Sources of funds for capital expenditures by public/private/foreign aid.
3. The proportionate division of national financing of recurring expenditures between public and private sources. (Chesswas, 1969, p. 28).

F. Expenditures on education
1. Total expenditures
   a. Recurring expenditures by sector, by national/foreign aid.
   b. Capital expenditures by sector, by national/foreign aid.
   c. Total national expendites, by recurring/capital, expressed as a proportion of a national or domestic product.
   d. Proportions of total national recurring expenditure on education spent on each sector.
   e. Comparison of total recurring expenditure less foreign aid, with total capital expenditure, including foreign aid. (Chesswas, 1969, p. 30).

G. Educational unit costs (Statistics of expenditures, teachers and students should be summarized and analyzed to give the following information.)
1. Recurring costs
   a. Costs of teachers
      1). The stock of teachers of each qualification by sex in each area of the educational system and on each point of each salary scale.
      2). Or, estimated average salaries of teachers of each qualification in each area.
   b. Non-teacher costs
      1). Average non-teacher expenditures per student enrolled by major element of expenditure by sector.
      2). Or, average totals of estimated non-teacher expenditures per student enrolled.
2. Capital Costs
   a. Scales of accommodation, furniture and equipment in schools, by sector.
      1). Scales of rooms by purpose, and by floor area.
      2). Scales of furniture and equipment.
   b. Costs of construction of schools per unit of area, by sector.
   c. Cost of furniture and equipment per student place, by sector.
   d. Differentials to be applied to b. and c. for each area. (Chesswas, 1969, p. 32).

II. Present practices in the schools
A. Syllabi recommended.
B. Curriculum actually followed.
C. Scale of equipment recommended.
D. Scale of equipment actually in schools.
E. Language policies and practices.
F. Actual and intended relations between the schools and the community which they serve. (Hawes, 1972, p. 25).

III. Information about the children
   A. The nature of the traditional cultures in which they grow up and the effects of these cultures on children's attitudes to learning.
   B. Their cognitive development in relation particularly to the development of perception, classification and abstraction in critical stages of development.
   C. Their linguistic capabilities and limitations.
   D. Their aspirations and the extent to which these are met. (Hawes, 1972, p. 25).

IV. Information about teachers and the conditions in which they work.
   A. Their academic, linguistic, and professional backgrounds.
   B. Their attitudes towards the present curriculum.
   C. Their attitudes towards proposals to change.
   D. Their relations with the community they serve.
   E. Their morale.
   F. Their aspirations for the future. (Hawes, 1972, p. 25).

Much of the above information should be acquired by headmasters, teachers and inspectors in the field. In this way, these people can be made to feel that through their own local knowledge and experience they are providing information which they alone can give; that they are assisting change. At present, such people are not often involved. There is seldom any incentive for them to collect information. They do not know what information is required, how to collect it or what to do with it when they have it. It is necessary to:

1. provide them with some stimulus and some training;
2. accord some financial or professional recognition for useful work done in the field or to build a research element into teacher upgrading and retraining courses;
3. provide in-service courses in elementary research and survey methods for serving teachers and those who supervise them in the field.

Such field research needs to be centrally directed, collated and acted upon. This involves the identification of a coordinated series of package research projects, including validation projects, suitable for field workers to undertake.

At whatever level the collection of information occurs, somebody has to:

1. identify the priorities and break them down into manageable research tasks;
2. find people to carry out these assignments;
3. collect and collate the information received;
4. see that it is acted upon.

In the first case this may mean a committee representative of various interests at the university, in the Ministry of Education, and from the schools. Such a committee needs a full-time secretary to guide, to interpret and to follow-up the decisions.

For the remaining tasks it is certain that a full-time research coordinator is required who may act as secretary of any research committee. Because research shows less immediate and visible results than other forms of educational investment it may be necessary to seek external aid in the initial funding of a research coordinator and for some of the most pressing contract research projects. It is to be hoped that the results obtained will convince skeptical governments that this aspect of curriculum planning is worth investing in, and that, in fact, it is a waste of money not to do so.

Once the basic information has been gathered objectives must be established if serious curriculum reform is to occur. There must be national objectives closely linked with political policy and philosophy. Within this framework objectives must be worked out for each level of education and for each subject in the curriculum. Common objectives can be identified as valid for the first stage of education, wherever it is undertaken. Such a statement of objectives has been supplied by a UNESCO meeting of Experts on Curriculum of General Education held in 1968 in Moscow. A summary of this statement follows.

General Objectives for Curriculum Development in Developing Countries

1. Learning to learn: Basic knowledge and techniques
   A. The aim should be to teach methods of thinking and working and means of expression.
   B. The basic techniques, reading, writing and arithmetic (skills of hand and of observation) should be taught as tools, not as ends in themselves.
   C. The ends are the development of the use of languages, of thinking and reasoning, of purposive learning, of an enthusiasm to learn, of an ability to receive instruction, of an ability to work independently (and of an appreciation and critical awareness of the physical world).

2. Communication
   A. The development of the basic communciation skills of reading, writing, listening and speaking.
   B. The ends are the development of vocabulary and the use of accurate language patterns, of the ability to listen and comprehend, of the ability to express.
3. Values of society
   A. The development in individuals of the basic values of society learned through actions and situations rather than through formal instruction.
   B. Such values as those attached to learning, those involved in interaction with others, adult-child relationships, role differentiation, attitudes to other persons and groups.
   C. The development in individuals of a sense of national unity and of the role of their nation in a wider world community.
4. Personality--The development of certain aspects of personality, especially those involving the expression of feeling and relations with others.
5. Participation in a variety of activities--in music, art, poetry, physical activity: in a variety of areas of human experience.
6. Health and hygiene--to learn fundamental habits and attitudes towards health, nutrition and hygiene.

(Hawes, 1972, 28-29).

Such general objectives are of value as a framework for curriculum planning. Unless they can be interpreted in the light of a national political and educational philosophy, however, they are in danger of remaining expressions of hope rather than plans for action.

To frame and state objectives is not sufficient. They must be known and understood by the people whose job it is to act on them and transmit them, the teachers. They have to be clear about them and certain enough of them to be able to explain to those who ask, to teachers less well-trained than themselves, to parents, and to children. There are three main implications of this.

1. Those who frame objectives must express them in such a way that they can be both easily assimilated by a teacher and transmitted by him.
2. The objectives cannot simply be memorized. Teachers must have the time and opportunity to discuss them and the difficulties in achieving them to make them their own.
3. Since these objectives need to be discussed with the community which the school serves and since their attainment depends on community understanding and acceptance, teachers must be trained to understand and be able to communicate with the adult community, particularly the adult rural community.

At all levels the problem arises of the balance necessary between the objectives we want to achieve and the objectives considered possible to achieve. While the goal may be to effect changes as fast as possible, the amount of change affordable by a system or tolerable by an average teacher is limited.

Where circumstances are adverse it may prove wise to be content with the following relatively modest objectives for primary education:

1. The achievement of permanent functional literacy in one language.
2. A satisfactory level of simple numeracy.
3. The development of a sympathetic awareness of the environment of which the children and their school are a part.
4. The development of a degree of national pride and consciousness.
5. The improvement of attitudes towards health and sanitation beyond the level existing in the local community.
6. The inculcation, through the school, of acceptable moral standards. (Hawes, 1972, p. 34).

Many primary school teachers could feel justifiable pride to have achieved these objectives with their children.

To become a reality major curriculum change needs to be guided by a strategy. The scope and nature and timing of the changes proposed must first be decided. Administrative machinery must be set up, financial support planned, and policy decisions made before the detailed process of curriculum development can begin.

The Advisor's Role

Since many educational planners work in the role of advisor it is necessary to consider that role. The ways in which a person's advisory tasks can be carried out depends, on the following factors to a great extent:

1. His professional competence,
2. The duration of his stay (four years seems best, Curle, 1968, p. 11),
3. His sponsorship, and
4. The place where he works.

As an advisor works in another country or in a sector of his own country which is culturally different from his own, he will find that the difference in context creates a major difference in content. The subject-matter of the job is different, so too is the structure of the job, since administration is part of advising.

The most constructive attitude is one of reappraisal. His expertise cannot be imported intact. He must re-evaluate his local counterpart, understand the relevance of his knowledge, and eventually establish the relations proper between colleagues rather than the polarity of adviser and advisee.

If he does not cut himself off from his environment but tries to understand it, he will find that the people he has come to advise, and in particular his colleague, know much more about the situation than he does--not just about the social and political context, but about the professional details and possibilities. This whole initial stage might be characterized as earning the right to advise.

There are certain tasks which more appropriately fall to the adviser than to others.

1. He can carry out studies or write position papers for the use of his colleague. It will be important that what he writes be addressed primarily to his colleague to use as he sees fit. If the adviser circulates his papers widely it might seem as though he were seeking another role for himself and were by-passing his colleague, thus damaging the essential relationship. The preservation of this important relationship demands that the adviser work with his colleague and to his specifications.
2. Another important job for the adviser is to place at the disposal of his colleague any specialized knowledge or techniques he may possess. These will be particularly important where the local personnel have had little experience in the field.
3. He will also be useful as a commentator, as a friendly critic, bringing to bear his different experience and background, on a variety of reports, working papers, and plan drafts.
4. He can perform a useful role in drawing attention to individuals or publications of value in particular branches of planning, and in putting his local colleagues in touch with appropriate people and agencies in other countries.
5. Report-writing is another role which should occasionally be engaged in. A timely and judicious report can have a considerable impact, but it is, a one-occasion venture and can never substitute for the steady flow of information and influence which result from a good adviser-colleague relationship. Also, the report protects the adviser from subsequent distortion of his views or advice; it serves as a record of what he actually said and did.

The Curriculum Planner's Role

In school systems in developing countries it is necessary to decide the nature and speed of changes possible in order to organize administrative, human and financial support to make them a reality.

There are three ways to make the task more manageable for the curriculum planner.

1. He can point out to his professional and political superiors how much they are asking and exactly how much support he needs if they are not to be disappointed.
2. Next, he can limit the scope of curriculum implementation by insisting that new curricula should only be introduced in schools where facilities exist to render its success possible.
3. Finally, he can extend the time of implementation so that some breathing space is gained for those who are engaged in preparing for the changes. (Hawes, 1972, p. 35).

It is necessary at the same time to decide who shall be responsible for carrying out curriculum change. Experience seems to suggest that policy decisions are far better taken at the ministry level, which writes the plans and makes the estimates and hires and trains the teachers, than they are in a curriculum development center or an institute which does none of these things. The best option may be both a curriculum planning section in the ministry and a curriculum development center. The duties of each may be as follows:

I. Curriculum planning section
   - A. Draws up plans, or commissions them.
   - B. Makes certain that the financial implications of the plans are reflected in estimates.
   - C. Makes policy decisions or sees that they are made.
   - D. Coordinates all the separate agents that must be brought together.
     1. The servicing of planning and policy committees that bring together the different sections of the ministry, the inspectors, the planners, the administrators, the men from headquarters and those from the field.
     2. Coordination of the professional committees set up to discuss objectives and plan curriculum content.

II. Curriculum development center
   - A. Complements work of the planning section.
   - B. Works out detailed curricula.
   - C. Tests curricula.
   - D. Modifies curricula.
   - E. Assists in implementation of curricula.

Many policy decisions will have to be made, often before a new project is begun. The major areas of decision are listed below.

I. Curriculum policy (general)
   - A. Main objectives and major emphasis of the school curriculum.
   - B. Language policy.
   - C. Subject divisions and links between subjects.

D. Setting up committees.
   1. Size of committee.
   2. Terms of reference of committee
   3. Composition of committee.
   4. Relations of committee with full-time curriculum workers.
E. Target date for the implementation of changes.
F. Proposed pattern of implementation.

II. Basic information -- Setting up machinery for identification, collation and processing of basic information required for effective curriculum planning.

III. Links with the community
   A. Policies necessary to make the community aware of the proposed changes.
   B. Establishment of links with other ministries.

IV. Implications on building policies
   A. Affect of new curricular policies on basic plans and costings for primary schools.
   B. Minimum standards which can be guaranteed for carrying out the planned curriculum.
   C. Policies necessary to raise all building to such minimum levels to enable the new curriculum to be implemented in them.

V. Production and distribution of books and materials.
   A. Policy.
   B. Centralization or private enterprise's role in production and distribution of books and materials.
   C. Financial allocation for the purhcase and renewal of equipment at various levels in the primary schools and limits resulting on the production and distribution policy.
   D. Official copyright and royalty payment policies.
   E. Percentage of educational materials produced locally and imported.
   F. Use of mass media in primary education and financial and administrative implications of any decision for their widespread use.

VI. Examination reform
   A. The extent new policies necessitate a change in the type and structure of the terminal examination.
   B. Financial and administrative implications of changes.
   C. Effects on the process of selection for the second stage of education.

VII. Teacher education and follow-up
   A. Extent to which a new curriculum policy will demand better educated and trained teachers at various levels.
   B. Implications on policies of recruitment into colleges and provisions for payment of such teachers once they enter the service.
   C. Changes needed in the present pattern of inservice education in its administration and the financial allocation for it.
   D. Changes necessitated in numbers and quality of inspectors or in entire policy of inspection. (Hawes, 1972, 38-39).

Inservice training and inspection are the most in need of prompt decision. Compulsory inservice training can assist curriculum. Without it, such change often cannot occur.

Within the guidelines of a national curriculum policy and under the direction of a curriculum planning unit the detailed processes of curriculum development occur. The planning of national curricular reform should occur in four general stages:

1. A preliminary stage of controlled experimentation.
2. A stage of limited implementation.
3. A stage of final evaluation.
4. A stage of universal dissemination (Richmond, 1967, p. 5).

Ideally, the process must be accompanied in its later stages by a parallel nationwide revision of curricula in the preservice training of teachers and a massive program of retraining for college tutors, teachers in the field and for inspectors. Examination reform must accompany syllabus reforms and the production of new curricular material. The whole process is linked to book production and distribution, and to the production of mass media programs, which should be designed as part of the same operation rather than having to be added into the process at a later date. Problems are certain to occur during these processes. Some major ones follow.

1. Subject specialists should design the material. But it is best done in teams and should contain a large proportion of teachers who will actually use the material, either in schools or colleges.
2. Often too much new material is designed. Materials should be designed within the financial capabilities of schools, and could be adapted from material already existing.
3. Implementation in pilot programs should be tried out in as many different social conditions as possible, in each case a cross-section of schools and not exclusively in the better schools with the better teachers.
4. The process will probably take longer than politicians would like to allow. It is unlikely that properly tested and revised materials can be produced under three years and it is wiser to allow four. The three year schedule is worked out on the assumption that the initial writing of the material takes nine months, testing in schools, a year, revision three months, and production and distribution a further year.

5. Only as much implementation as can be expected to stand a reasonable chance of success should be attempted. A more flexible syllabus policy involving the introduction of a new approach in a gradually increasing number of schools, and a greater measure of specialization permitted both in schools and teacher's colleges may make it possible to achieve what would otherwise be administratively impossible.
6. As much follow-up and a sympathetic follow-up as is possible is necessary. Follow-up should provide someone to answer questions, keep up enthusiasm, demonstrate and re-demonstrate new techniques and visit with teachers.
7. Initial success in a curriculum project is vital. All those involved must be convinced to keep up the work. (Hawes, 1972, 40-44).

Any serious attempt to build a new school curriculum must include means for evaluating its efficiency. In part, such evaluation can be provided through school examinations; but examinations, particularly public examinations, are far more than instruments of evaluation. They are determinants of curricula, and therefore examination policy and construction is one of the most important aspects of curriculum planning.

Since examinations are generally used, it is necessary to establish a closer relationship between the examination and the objectives which the school hopes to achieve, between the style of the examination and the curricular practices which it is hoped to introduce. In this way the examination can be conceived as an instrument of reform rather than as a barrier to it.

Unfortunately there are some obstacles to overcome before such relationship can be established. The terminal examination for primary education is often conceived largely as an instrument of secondary selection. This is often reflected in the way it is administered. It may often be set by secondary schoolmasters and controlled by those whose sympathies lie with secondary rather than primary education. Therefore, those responsible for developing curricula in primary schools may have little direct responsibility for the examinations policy.

It follows that any attempt to put the examination to use both as an instrument of evaluation and as a reinforcer of good curriculum practices will involve the curriculum planner in a struggle to change entrenched policies. He must fight his battles on at least four fronts;

1. He must attempt to establish what the examination is trying to do. In a primary leaving examination the emphasis must be on leaving. It cannot double as a secondary selection examination.
2. He must try to make such that those responsible for curriculum design achieve administrative control of the examination process and that at every stage the making of the curriculum and the design of the instrument to evaluate it are coordinated.
3. He must see that the machine has its place, that personnel are trained to make the best and most flexible use of the techniques of objective testing, and that this form of examination is used only for tasks which it can adequately accomplish.
4. He must ensure that consideration is given, as far as possible, to developing other forms of valid assessment to complement that provided by formal examinations. (Hawes, 1972, 46-47).

School examinations are an important form of evaluation, but their design and application come somewhat late in the process of curriculum development, and the planner faces the necessity, as soon as he starts using an experimental curriculum, of trying to see how far it is achieving the objectives set for it.

A major problem with adequate evaluation is the inadequacy of personnel to undertake evaluation and the lack of understanding of how to use the potential assistance already available. It is important to recognize evaluation as assessment of how well a curriculum is working. It is important to see it as a means of finding where the weaknesses are and to recognize that this can be done well by the people in the field, by teachers, inspectors, and headmasters. The curriculum planner must give these people guidance on what questions to ask, either through building the right questions into the detailed framework of a curriculum or by bringing field workers together to discuss the aims of the evaluation and framing the questions in consultation with them. The results of this less formal evaluation can be added to information derived from the use of more scientific techniques. All must be collated and, where necessary, acted upon competently and quickly if the curriculum is to be improved and if the cooperation of those in the field is to be retained.

The entire process is demanding of expertise, cooperation, time, and some expense. Well-organized curriculum change is not impossible nor beyond the means of a nation. Most of all, carefully planned and executed change is necessary.

Conditions for Success in Planning

The conditions for success in educational planning must be analyzed when the planner and adviser begin their work. Several conditions have, through experience, been established (Ruscoe, 1969, 33-34). They are:

1. Political commitment to educational planning must include both commitment to establish planning offices and commitment to support planning activities.
2. Educational planners must know what are their responsibilities and rights.
3. Rigorous but not rigid distinctions must be made between political, technical and administrative areas of educational planning.
4. Greater attention must be given to diffusing the power to make political and technical decisions so that it does not reside entirely within one position or a few positions at the top of the power hierarchy.
5. Greater attention must be given to the development of clear educational politics and priorities so that educational planners have some better notion of what they are planning for.
6. A central task of educational planners must be the development of clear, technical alternatives as means of attaining given politico-educational aims.
7. As a corollary, an attempt must be made to reduce the politicization of knowledge prevalent in many countries.
8. Greater effort must be made to assess public opinion on the future development and direction of education and to elicit public support for the making and carrying-out of educational plans.
9. Educational administrators must more actively support the changes implied in educational planning.
10. Where considerable portions of the educational system are not under the direct control of the government, greater effort must be made to establish mutually beneficial coordination between government and private and university educational authorities.

Meeting these conditions would seem to necessitate immediate, full-scale political and administrative reform. But such reform is not likely to occur rapidly on its own. Therefore a choice must be made: either to confront the problem directly, seeking dramatic, immediate changes in political and administrative arrangement; or find routes which avoid direct confrontation. The indirect appraoch appears to offer certain advantages over the direct approach.

1. Educational planners, because of their relatively weak position in the educational areas, are unlikely to be able to bring about dramatic reform, either by themselves or with the help of a few sympathizers.
2. Failure to carry off reform may doom both the reform and the planners.
3. Attempts at large-scale reform at this moment are likely to intensify the political and administrative constraints already present.
4. The indirect approach can be so constructed as to make use of certain minor successes which educational planners have already experienced.

The indirect approach involves improvements being made by small increments. There is danger that at any one point in this procedure educational planning will be still only a pale shadow of what it should be.

There are four conditions which can be improved without adopting policies of direct confrontation: (Ruscoe, 1969, p. 35).

1. Reinforcing the common ground between educational and general planners, thereby enlisting outside support for educational planning.
2. Capitalizing on good educational planning techniques already established, thereby improving the status of educational planners.
3. Increasing educational planners capacity to handle new data and new responsibilities, thereby making them more ready to move into new areas as they are opened up; and
4. Joining with those engaged in the study and reform of public administration, thereby increasing educational planners awareness of current administrative strengths and weaknesses which affect plan implementation.

Success in these four conditions will serve as first steps in improving the environment in which educational planning occurs.

The decisions in an educational plan are political in their nature and in their effects. They are decisions about who shall get how much of a limited resource, and when. They affect people in an important area in human relations, the future of their children. There are factors, political in nature, which do affect educational planning.

1. Formal education, used in all countries for the political mobilization of the people, may be perverted so as to achieve little else; or the political content may be adequate only to achieve and ensure a minimum of national cohesion.
2. There is competition between regions, classes, institutions, political parties, economic interests and persons to control or influence the central government.
3. High priority for the production of skilled manpower involves new educational institutions. While this may cost more than sending men overseas for training, the training may be more relevant, and there is less risk of trained persons who may decide to stay overseas.
4. The development of an effective bureaucracy, with the processes of selection and promotion based on merit, is essential. But the institutions of higher education tend to serve mainly those parts of the country which have been longest under colonial or other western influence.
5. The educational planner is a product of modern western education. In developing countries it involves planning to influence the course of social change. Adult and community education are necessary for this, and they involve knowledge and respect for the familiial and the religious. The adjustment is difficult, and those persons who can make it and act effectively are rare. (Rowley, 1971, 53-56).

The educator generally holds to the values of equal educational opportunity, and of the function of education in developing human potential and personality. This brings him to a dilemma. For, if he adheres strictly to these ideals, he becomes politically ineffective. He has to realize the existence of power, and how it must be wielded. Otherwise his plan tends to be a statement of what ought to be done in a political system as he thinks it ought to be done. To be effective he must produce an action plan which can be modified without losing all that he aims for. Otherwise his plan will resemble many of the national constitutions proclaimed with high hopes in the last two decades or so. It will be mainly an assertion of respectability.

On the other hand, the planner without ideals can find himself used mainly as a propagandist and technician by the government of the day. The difficult task is to balance what is best with what is possible.

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